IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:

Blau *et al.*

Serial No.: 10/727,088

Filed: December 2, 2003

For: MAN-RATED FIRE SUPPRESSION SYSTEM

Confirmation No.: 6016

Examiner: D. Hwu

Group Art Unit: 3752

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April 22, 2010

BRIEF ON APPEAL

Mail Stop Appeal Brief – Patent
Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attention: Board of Patent Appeals and Interferences

Sirs:

This appeal brief is submitted pursuant to 37 C.F.R. § 41.37 and in the format required by 37 C.F.R. § 41.37(c), along with the fee required by 37 C.F.R. § 41.20(b)(2):

1) REAL PARTY IN INTEREST

U.S. Application Serial No. 10/727,088 (the "'088 Application"), the application at issue in the above-referenced appeal, has been assigned to Alliant Techsystems Inc., as evidenced by the assignment recorded with the U.S. Patent & Trademark Office on March 22, 2004, at Reel No. 015111, Frame No. 0631. Therefore, the real party in interest in the present pending appeal is Alliant Techsystems Inc.

2) RELATED APPEALS AND INTERFERENCES

A Notice of Panel Decision from Pre-Appeal Brief Review in the '088 Application may be related to, directly affect, or have bearing on the Board's decision in this appeal. A copy of the decision rendered by the Panel, which was transmitted September 25, 2008, is included in the RELATED PROCEEDINGS APPENDIX.

Appeal No. 2002-0304 may be related to, directly affect, or have bearing on the Board's decision in this appeal. Appeal No. 2002-0304 was a decision on appeal by the Board from the Examiner's final rejection of the claims in U.S. Patent Application No. 09/025,345, which has now issued as U.S. Patent No. 6,969,435. A copy of the decision rendered by the Board, which was mailed on January 31, 2003, is included in the RELATED PROCEEDINGS APPENDIX.

3) STATUS OF CLAIMS

The '088 Application was filed with seventy-eight claims. New claims 79-93 were added by way of a Preliminary Amendment filed on March 18, 2005. New claims 94-114 were added by way of an Amendment accompanying a Request for Continued Examination filed on January

11, 2007. New claim 115 was added by way of an Amendment accompanying a Request for Continued Examination filed on October 31, 2007. New claims 116-119 were added by way of an Amendment filed on March 13, 2008.

Claims 1-5, 7-16, 18-67, 69-90, and 94-119 are currently pending in the '088 Application. Each of claims 1-5, 7-16, 18-67, 69-90, and 94-119 stands rejected. No claims are allowed.

Claims 29, 30, 66, and 67 were previously withdrawn.

Claims 6, 17, 68, and 91-93 were previously canceled.

The rejections of claims 1-5, 7-16, 18-67, 69-90, and 94-119 are being appealed.

4) STATUS OF AMENDMENTS

A Final Office Action ("Final Office Action") was mailed on November 23, 2009. On January 22, 2010, an Amendment under 37 C.F.R. § 1.116 was filed in response to the Final Office Action. In the Amendment, changes to the specification were proposed. However, no amendments to the claims were proposed.

The most recent claim amendments in the prosecution of the '088 Application were submitted in an Amendment accompanying a Request for Continued Examination filed on July 20, 2009.

An Advisory Action was mailed on February 8, 2010.

A Notice of Appeal was filed on February 22, 2010.

5) SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 1 of the presently claimed invention is directed to a fire suppression system that comprises a chamber and at least one gas generant housed therein. The '088 Application at least at paragraph [0023]. The at least one gas generant comprises a non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate composition that is formulated to pyrotechnically produce an inert gas mixture comprising carbon dioxide at a concentration less than or equal to the Immediately Harmful to Life or Health concentration of carbon dioxide. *Id.* at least at paragraphs [0021] and [0025]-[0027]. The at least one gas generant is also formulated to pyrotechnically produce no sodium chloride. While Appellants acknowledge that the '088 Application does not explicitly describe that combustion of the gas generant does not produce sodium chloride, a person of ordinary skill in the art would understand, based on the ingredients of the gas generant described in the '088 Application at least at paragraphs [0025]-[0035], that no sodium chloride is produced upon combustion of the gas generant. The fire suppression system is configured to dispel, at an exit thereof, the inert gas mixture to provide a dispelled inert gas mixture into a space. *Id.* at least at paragraphs [0020], [0022], [0051], and [0055]. The dispelled inert gas mixture comprises carbon dioxide in a concentration substantially equal to the concentration pyrotechnically produced by the at least one gas generant. *Id.* at least at paragraphs [0020], [0022], and [0048]-[0055].

Dependent claim 19 depends indirectly from claim 1 and is directed to a heat management system comprising a phase change material. *Id.* at least at paragraph [0050].

Dependent claim 20 depends indirectly from claim 1 and is directed to a phase change material comprising lithium nitrate, sodium nitrate, potassium nitrate, or mixtures thereof. *Id.*

Dependent claim 21 depends indirectly from claim 1 and is directed to the fire suppression system being configured to transfer heat from the inert gas mixture to the phase change material. *Id.* at least at paragraph [0053].

Dependent claim 29 depends indirectly from claim 1 and is directed to an igniter composition comprising from approximately 15% to approximately 30% boron and from approximately 70% to approximately 85% potassium nitrate. *Id.* at least at paragraph [0042].

Dependent claim 30 depends indirectly from claim 1 and is directed to an igniter composition comprising strontium nitrate, magnesium, and an organic binder. *Id.*

Dependent claim 51 depends indirectly from claim 1 and is directed to a phase change material comprising lithium nitrate, sodium nitrate, potassium nitrate, or mixtures thereof. *Id.* at least at paragraph [0050].

Dependent claim 52 depends indirectly from claim 1 and is directed to heat from the inert gas mixture being transferred to the phase change material. *Id.* at least at paragraph [0053].

Independent claim 57 of the presently claimed invention is directed to a method for fighting a fire in a space. The method comprises igniting at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant to produce an inert gas mixture comprising carbon dioxide. *Id.* at least at paragraphs [0021] and [0025]-[0027]. The inert gas mixture is dispersed into a space to extinguish a fire. *Id.* at least at paragraphs [0022] and [0025]. The dispersed inert gas mixture comprises carbon dioxide in a concentration substantially equal to the concentration produced by ignition of the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant such that the space comprises carbon dioxide at a concentration less than or equal to the Immediately Harmful

to Life or Health concentration of carbon dioxide. *Id.* at least at paragraphs [0021], [0025]-[0027], [0048]-[0055], and [0068]-[0079].

Dependent claim 66 depends indirectly from claim 57 and is directed to a method of fighting a fire in a space where igniting an igniter composition comprises igniting an igniter composition comprising from approximately 15% to approximately 30% boron and from approximately 70% to approximately 85% potassium nitrate. *Id.* at least at paragraph [0042].

Dependent claim 67 depends indirectly from claim 57 and is directed to a method of fighting a fire in a space where igniting an igniter composition comprises igniting an igniter composition comprising strontium nitrate, magnesium, and an organic binder. *Id.*

Dependent claim 76 depends indirectly from claim 57 and is directed to flowing the inert gas mixture over a phase change material. *Id.* at least at paragraph [0053].

Independent claim 107 of the presently claimed invention is directed to a fire suppression system that comprises at least one gas generant formulated to pyrotechnically produce an inert gas mixture comprising less than approximately 4% by volume of carbon dioxide. *Id.* at least at paragraphs [0004] and [0021]. The at least one gas generant comprises hexa(ammine)cobalt(III)-nitrate and guanidine nitrate. *Id.* at least at paragraph [0027]. The fire suppression system is configured to dispense, at an exit thereof, the inert gas mixture comprising carbon dioxide in a concentration substantially equal to the concentration pyrotechnically produced by the at least one gas generant. *Id.* at least at paragraphs [0020], [0022], and [0048]-[0055].

Independent claim 116 of the presently claimed invention is directed to a fire suppression system that comprises a chamber and at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant housed therein. *Id.* at least at paragraphs

[0021] and [0025]-[0027]. The at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant is formulated to pyrotechnically produce a first gas mixture comprising carbon dioxide. *Id.* at least at paragraph [0027]. The fire suppression system is configured to dispel, at an exit thereof, the first gas mixture and a second gas mixture comprising carbon dioxide into a space to provide carbon dioxide at a concentration less than or equal to the Immediately Harmful to Life or Health concentration of carbon dioxide in the space. *Id.* at least at paragraphs [0020], [0022], and [0048]-[0055] and at least at paragraphs [0018], [0032], [0037]-[0039], [0042]-[0044], and [0051] of U.S. Patent Application Serial No. 10/727,093 (the "'093 Application"), filed on December 2, 2003, and entitled "Method and Apparatus for Suppression of Fires," now United States Patent No. 7,337,856. The latter application was incorporated by reference in paragraph [0001] of the '088 Application and, therefore, is properly relied upon as support for the claim amendments.

Independent claim 117 of the presently claimed invention is directed to a fire suppression system that comprises a chamber and at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant housed therein. The '088 Application at least at paragraph [0023]. The at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant is formulated to pyrotechnically produce an inert gas mixture comprising carbon dioxide at a concentration less than or equal to the Immediately Harmful to Life or Health concentration of carbon dioxide. *Id.* at least at paragraph [0021]. The fire suppression system is configured to dispel, at an exit thereof, at least a portion of the inert gas mixture. *Id.* at least at paragraphs [0020], [0022], and [0048]-[0055] and at least at paragraphs [0018], [0032], [0037]-[0039], [0042]-[0044], and [0051] of the '093 Application.

The dispelled inert gas mixture comprises carbon dioxide in a concentration equal to the concentration pyrotechnically produced by the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant. The '088 Application at least at paragraphs [0020], [0022], and [0048]-[0055].

Independent claim 118 of the presently claimed invention is directed to a fire suppression system that comprises a chamber and at least one gas generant housed therein. *Id.* at least at paragraph [0023]. The at least one gas generant comprises a non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate composition that is formulated to pyrotechnically produce an inert gas mixture comprising carbon dioxide. *Id.* at least at paragraphs [0021] and [0025]-[0027]. The fire suppression system is configured to dispel, at an exit thereof, the inert gas mixture as pyrotechnically produced into a space, the space comprising carbon dioxide at less than approximately 4% by volume. *Id.* at least at paragraphs [0004], [0020]-[0022], [0051], and [0055] and at least at paragraphs [0018], [0032], [0037]-[0039], [0042]-[0044], and [0051] of the '093 Application.

6) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Whether the status of claims 29, 30, 66, and 67 as "withdrawn" is proper.

B. Whether claims 1-5, 7-14, 18, 22-25, 57-65, 69, 72-75, 77, 78, 96-106, and 115-119 are unpatentable under 35 U.S.C. § 103(a) over U.S. Patent No. 5,449,041 to Galbraith ("Galbraith") in view of U.S. Patent No. 6,019,861 to Canterberry *et al.* ("Canterberry").

C. Whether claims 15, 70, 79, 80, 94, and 95 are unpatentable under 35 U.S.C. § 103(a) over Galbraith in view of Canterberry, and further in view of U.S. Patent No. 5,538,568 to Taylor *et al.* ("Taylor") and U.S. Patent No. 5,882,036 to Moore *et al.* ("Moore").

D. Whether claims 16, 71, and 81-90 are unpatentable under 35 U.S.C. § 103(a) over Galbraith in view of Canterberry and further in view of Taylor and U.S. Patent No. 6,481,746 to Hinshaw *et al.* ("Hinshaw").

E. Whether claims 19-21 and 76 are unpatentable under 35 U.S.C. § 103(a) over Galbraith in view of Canterberry, and further in view of U.S. Patent No. 5,739,460 to Knowlton *et al.* ("Knowlton").

F. Whether claims 26-28, 31-45, 48, 49, and 53-56 are unpatentable under 35 U.S.C. § 103(a) over Galbraith in view of Canterberry, and further in view of U.S. Patent No. 6,116,348 to Drakin ("Drakin").

G. Whether claim 46 is unpatentable under 35 U.S.C. § 103(a) over Galbraith in view of Canterberry, and Drakin, and further in view of Taylor and Moore.

H. Whether claim 47 is unpatentable over Galbraith in view of Canterberry, and Drakin, and further in view of Taylor and Hinshaw.

I. Whether claims 50-52 and 76 are unpatentable under 35 U.S.C. § 103(a) over Galbraith in view of Canterberry, and Drakin, and further in view of Knowlton.

J. Whether claims 107-114 are unpatentable under 35 U.S.C. § 103(a) over Galbraith in view of Canterberry, and further in view of Hinshaw.

7) ARGUMENT

A. Authority

The rejection of claims under 35 U.S.C. § 103(a) requires the Examiner to establish a *prima facie* case of obviousness. M.P.E.P. § 2142. To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all of the claim limitations. *In re Royka*, 490 F.2d 981, 985 (CCPA 1974); *see also* M.P.E.P. § 2143.03. Additionally, the Examiner must determine whether there is "an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1740-1741, 167 L.Ed.2d 705, 75 USLW 4289, 82 U.S.P.Q.2d 1385 (2007). Further, rejections on obviousness grounds "cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *Id.* at 1741, quoting *In re Kahn*, 441, F.3d 977, 988 (Fed. Cir. 2006). Finally, to establish a *prima facie* case of obviousness, there must be a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986). Furthermore, the reason that would have prompted the combination and the reasonable expectation of success must be found in the prior art, common knowledge, or the nature of the problem itself, and not based on the Applicant's disclosure. *DyStar Textilfarben GmbH & Co. Deutschland KG v. C. H. Patrick Co.*, 464 F.3d 1356, 1367 (Fed. Cir. 2006); MPEP § 2144. Underlying the obvious determination is the fact that statutorily prohibited hindsight cannot be used. *KSR*, 127 S.Ct. at 1742; *DyStar*, 464 F.3d at 1367.

B. References Relied Upon in the Final Office Action

1. Galbraith

Galbraith teaches a method and apparatus for suppressing a fire. Galbraith at column 1, lines 6-10. A solid propellant 14 in the apparatus is ignited to produce a first gas that includes carbon dioxide ("CO_2"), nitrogen, and water vapor. *Id.* at column 3, lines 3-5 and lines 64-67. The solid propellant is an azide-based or an azole-based mixture. *Id.* at column 4, line 23-column 5, line 11. In one embodiment of the apparatus, illustrated in FIG. 1, ignition of the solid propellant 14 produces a first gas 16, which is used to vaporize a vaporizable liquid 18 and form a second gas 24. *Id.* at column 3, lines 29-37. The second gas 24 is expelled from the apparatus and used to suppress a fire. *Id.* at column 5, lines 53-56. The solid propellant 14 is surrounded by a cooling material 38, such as magnesium carbonate. *Id.* at column 5, lines 29-32. When the cooling material 38 is heated, such as upon ignition of the solid propellant 14, additional CO_2 is generated. *Id.* at column 5, lines 32-34. In another embodiment of the apparatus, illustrated in FIG. 4, the first gas 16 produced by ignition of the solid propellant 14 is used directly as a fire suppressant. *Id.* at column 7, lines 41-44. The first gas 16 includes nitrogen, CO_2, and water vapor. Ignition of the solid propellant 14 also causes a magnesium carbonate containing propellant 72 to ignite, producing magnesium oxide and additional CO_2. *Id.* at column 7, lines 45-50. The first gas 16 and additional CO_2 flow through a magnesium carbonate cooling bed 76, which produces additional CO_2 upon heating. *Id.* at column 7, lines 51-54. The embodiment of the apparatus illustrated in FIG. 4 teaches that 3.1 pounds of CO_2 are produced by the magnesium carbonate containing propellant 72 and 6.9 pounds of CO_2 are produced by the magnesium carbonate cooling bed 76.

2. Canterberry

Canterberry teaches a gas generating composition that includes a non-azide fuel, ammonium nitrate, and silicon. Canterberry at the Abstract. The non-azide fuel is guanidine nitrate, oxamide, ammonium oxalate, aminoguanidine bicarbonate, hydrazodicarbonamide, azodicarbonamide, a tetrazole, a bitetrazole, a triazole, or mixtures thereof. *Id.* at column 4, line 65 through column 5, line 2. Gas generating compositions that included 5-aminotetrazole, ammonium oxalate, or azodicarbonamide as the non-azide fuel were formulated. *Id.* at column 8, line 29 through column 10, line 20, and Table I. Gas generating compositions that included the 5-aminotetrazole as the non-azide fuel were combusted to determine the amount of carbon monoxide, carbon dioxide, nitric oxide, and nitrogen dioxide produced. *Id.* at column 8, line 29 through column 10, line 20, and Table II. Industry standards of desirable levels of gaseous reaction products of gas generants are shown in Table III. *Id.* at column 10, lines 24-50. The gaseous reaction products include carbon monoxide and carbon dioxide. *Id.* The gas generating composition is potentially used in a fire suppression device. *Id.* at column 4, lines 44-45. Canterberry is silent regarding details of a fire suppression device and its operation.

3. Taylor

Taylor teaches a hybrid gas generating system that includes an extrudable gas generant having an oxidizer and a thermosettable resin. Taylor at column 1, lines 12-17 and column 2, lines 56-67. The thermosettable resin is an acrylate-terminated polybutadiene, a hydroxy-terminated polybutadiene/diisocyanate reaction product, an ester of a polybutadiene polycarboxylic acid and an epoxy modified polybutadiene and/or a hydroxyl-terminated

polybutadiene, and a styrene/polyester copolymer. *Id.* at column 3, lines 17-28. CO_2 and H_2O are produced upon combustion. *Id.* at column 5, lines 42-45. The gas generant also includes titanium dioxide and cupric oxide. *Id.* at column 5, lines 57-60 and column 6, lines 8-11.

4. Moore

Moore teaches an inflator that includes a gas generant. Moore at the Abstract. The gas generant includes HACN, basic copper nitrate, and guar gum or HACN, basic copper nitrate, guanidine nitrate, and guar gum. *Id.* at column 6, lines 23-36.

5. Hinshaw

Hinshaw teaches a gas generating composition that includes a metal complex, such as HACN, and polyacrylamide. Hinshaw at column 3, lines 51-59 and column 7, line 62 through column 8, line 7.

6. Knowlton

Knowlton teaches an autoignition composition used to ignite a gas generator composition. Knowlton at the Abstract. The autoignition composition includes an oxidizer and a powdered metal. *Id.* at column 2, lines 44-55. The oxidizer includes lithium nitrate, sodium nitrate, or potassium nitrate. *Id.*

7. Drakin

Drakin teaches a device for extinguishing a fire that includes a pyrotechnic composition. Drakin at column 1, lines 5-10. Upon ignition, the pyrotechnic composition produces a gas and aerosol mixture that includes hydrogen, oxygen, ammonia, and carbon-containing gases, such as carbon monoxide ("CO") and methane ("CH_4"). *Id.* at column 4, lines 1-21 and Table 1. The pyrotechnic compositions include carbon-containing ingredients, such as dicyaneamide, phenol formaldehyde resins, epoxy resins, and ballistite powder (nitrocellulose and nitroglycerin). *Id.* at Table 1. The gas and aerosol mixture is passed through an oxygen-containing oxidizer, which decomposes to oxygen. *Id.* at column 4, lines 1-21. The oxygen reacts with the gas and aerosol mixture and incompletely oxidized combustion products to produce carbon dioxide ("CO_2"), water ("H_2O"), and nitrogen ("N_2"). *Id.* The gas and aerosol mixture is cooled using a solid coolant. *Id.* at column 4, lines 31-32. The cooled mixture is filtered and the resulting vapor, gas, and aerosol mixture is discharged into a space having a fire. *Id.* at column 7, lines 24-33. The discharged mixture includes a gaseous phase and a solid phase. *Id.* at column 7, lines 18-23.

Drakin teaches a device for extinguishing a fire that includes a pyrotechnic composition. Drakin at column 1, lines 5-10. Upon ignition, the pyrotechnic composition produces a gas and aerosol mixture that includes hydrogen, oxygen, ammonia, and carbon-containing gases, such as carbon monoxide ("CO") and methane ("CH_4"). *Id.* at column 4, lines 1-21 and Table 1. The pyrotechnic compositions include carbon-containing ingredients, such as dicyaneamide, phenol formaldehyde resins, epoxy resins, and ballistite powder (nitrocellulose and nitroglycerin). *Id.* at Table 1. The gas and aerosol mixture is passed through an oxygen-containing oxidizer, which decomposes to oxygen. *Id.* The oxygen reacts with the gas and aerosol mixture and

incompletely oxidized combustion products to produce carbon dioxide ("CO_2"), water ("H_2O"), and nitrogen ("N_2"). *Id.* The gas and aerosol mixture is cooled using a solid coolant. *Id.* at column 4, lines 31-32.

C. Responsiveness to Prior Arguments

Appellants note that the Examiner has failed to address or respond to the specific rebuttal arguments set forth in Appellants' Amendment filed on January 22, 2010, Response filed on September 17, 2009, Amendment filed on March 13, 2008, Pre-Appeal Brief filed on August 18, 2008, Amendment filed on March 2, 2009, Amendment filed on July 20, 2009, and Amendment filed on January 22, 2010, other than to state that "Applicant[s'] arguments have been considered but are moot in view of the new ground(s) or rejection" or "Applicant[s'] amendment necessitated the new ground(s) of rejection." Office Action of October 1, 2008, p. 2, Final Office Action of April 20, 2009, p. 7, and Office Action of August 13, 2009, p. 2. Appellants submit that such an approach to examination is clearly contrary to established examination guidelines because it encourages piecemeal examination. Particularly, Appellants note that "[w]here the applicant traverses any rejection, the examiner should, if he or she repeats the rejection, take note of the applicant's argument and answer the substance of it." M.P.E.P. § 707.07(f).

Appellants' arguments in the Responses and Amendments mentioned in the previous paragraph have provided specific reasons rebutting the Examiner's alleged *prima facie* case of obviousness. However, since the Examiner has not addressed or responded to Appellants' specific arguments, Appellants have been unable to prepare appropriate responses thereto.

D. Duration of Prosecution

The obviousness rejections in the Office Action of August 13, 2009, and the Final Office Action rely primarily on the combination of Galbraith and Canterberry. Appellants note that a similar combination of Galbraith and Canterberry was relied upon by the Examiner in the Final Office Action of June 16, 2008, p. 2. In response to the Final Office Action of June 16, 2008, Appellants filed a Notice of Appeal and Pre-Appeal Brief on August 15, 2008, in which the rejections in light of Galbraith and Canterberry were addressed. On September 25, 2008, a Notice of Panel Decision from Pre-Appeal Brief Review was transmitted, in which prosecution was reopened and the previous rejections were withdrawn. In the next Office Action (dated October 1, 2008), the Examiner relied upon Galbraith in combination with additional references. This fact, in combination with the Notice of Panel Decision from Pre-Appeal Brief Review, indicated to Appellants that the previous rejections in light of Galbraith and Canterberry had been overcome.

However, prosecution now appears to have come full circle in that the Examiner, over twenty-one months later, relies upon Galbraith and Canterberry to reject the pending claims, even though rejections in light of that combination of references had been previously addressed by Appellants and withdrawn by the Examiner. While Appellants noted this point in the Response filed on September 17, 2009, the Examiner provided no response thereto in the Final Office Action.

As an additional matter, Appellants note that the '088 Application has been pending for over six years and has undergone substantial prosecution, including a personal interview with the

Examiner on September 22, 2009. However, little progress has been made to advance the application to allowance.

E. Claims 29, 30, 66, and 67 should be under consideration in the '088 Application

The status of claims 29, 30, 66, and 67 has been indicated by the Examiner as being "withdrawn." However, the Election of Species Requirement regarding claims 29, 30, 66, and 67 should be withdrawn because the Examiner has not presented sufficient reasons for maintaining the species election of these claims. The Election of Species Requirement regarding claims 29 and 30 should be withdrawn because the subject matter of these claims is already under consideration since substantially similar subject matter is recited in claims 66 and 67.

In regard to claims 66 and 67, the Examiner has indicated that these claims are withdrawn as being identical to withdrawn claims 29 and 30, respectively. However, claims 66 and 67 are not identical to claims 29 and 30 because the former claims recite method-like limitations, while the latter claims recite composition of matter-like limitations. In addition, since the Examiner has not provided any reasons for maintaining the species election of claims 29 and 30, the reasons for withdrawing claims 66 and 67 are unclear.

Therefore, the Election of Species Requirement regarding claims 29, 30, 66, and 67 should be withdrawn and these claims should be under consideration in the pending application.

F. Claims 1-5, 7-14, 18, 22-25, 57-65, 69, 72-75, 77, 78, 96-106, And 115-119 Are Not Obvious In View Of Galbraith in view of Canterberry

Claims 1-5, 7-14, 18, 22-25, 57-65, 69, 72-75, 77, 78, 96-106, and 115-119 stand rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over Galbraith in view of Canterberry.

1. Claims 1-5, 7-14, 18, 22-25, 96-100, and 115

Galbraith and Canterberry, alone or in combination, do not teach or suggest all the limitations of independent claim 1 because nothing in Galbraith or Canterberry teaches or suggests the limitation of "the at least one gas generant comprising a non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate composition formulated to pyrotechnically produce no sodium chloride and an inert gas mixture comprising carbon dioxide at a concentration less than or equal to the Immediately Harmful to Life or Health concentration of carbon dioxide." Galbraith does not teach or suggest this limitation because its solid propellants are azide- or azole-based. In addition, Galbraith does not teach or suggest that the solid propellants used in its apparatus produce carbon dioxide at a concentration less than or equal to the Immediately Harmful to Life or Health concentration. While Galbraith teaches that carbon dioxide, nitrogen, and water vapor are produced upon ignition of the solid propellant, Galbraith does not teach relative amounts of the produced gases.

Canterberry also does not teach or suggest the recited gas concentration. The Examiner states that Tables II and III show that the gas generating compositions of Canterberry, when combusted, produce levels of carbon dioxide that are less than the desirable levels and that these desirable levels are equivalent to the Immediately Harmful to Life or Health concentrations. Office Action of Office Action of August 13, 2009, p. 2. However, the gas analysis results shown in Table II of Canterberry are for gas generating compositions that include 5-aminotetrazole (an azole) as the non-azide fuel while Table III shows industry standards of desirable levels of gaseous reaction products of gas generants. Since the combustion results in Table II are for gas generating compositions that include an azole fuel, the combustion results do not support the Examiner's assertion because these gas generating compositions are <u>not</u> non-azole compositions as recited in claim 1. While Canterberry teaches that oxamide may be used as the fuel, Canterberry does not teach or suggest specific compositions that include oxamide. Since the production of carbon dioxide is dependent upon the ingredients in the gas generating compositions and since specific compositions that include oxamide are not taught or suggested in Canterberry, Canterberry does not and cannot teach or suggest the amounts of carbon dioxide produced upon combustion of a composition that includes oxamide. Furthermore, one of ordinary skill in the art would expect an oxamide-containing composition, upon combustion, to produce a greater amount of carbon dioxide than is produced by a similar composition containing 5-aminotetrazole. Such an oxamide-containing composition would produce more carbon dioxide because oxamide (chemical formula of $C_2H_2N_2H_4$) includes two atoms of carbon per mole of oxamide compared to 5-aminotetrazole (chemical formula CH_3N_5), which includes one atom of carbon per mole of 5-aminotetrazole.

When discussing Canterberry, the Examiner states that "it would be obvious to one having ordinary skill in the art . . . that the level of carbon dioxide produced would be less than or equal to the Immediately Harmful to Life or Health concentration." Final Office Action, p. 2. However, the Examiner has provided no reasoning in support of this statement. Furthermore, the Examiner has not responded to Appellants' arguments in the previous paragraph that the combustion results in Canterberry are for gas generating compositions that include an azole fuel and that an oxamide-containing composition would produce greater amounts of carbon dioxide due to the higher carbon content of oxamide.

The Examiner also states that "[s]ince the Immediately Harmful to Life or Health concentration as recited in claim 1 is obviously a requirement of some sort, it would be obvious to one having ordinary skill in the art that the carbon dioxide produced would [be] equal to or less than this requirement." Final Office Action, p. 7. As best understood by Appellants, the Examiner appears to be saying that because the Immediately Harmful to Life or Health concentration is a so-called "requirement," the concentration of carbon dioxide produced would necessarily be less than the Immediately Harmful to Life or Health concentration. However, the amount of carbon dioxide produced is dependent on the ingredients of the gas generating composition that is combusted, and is not dependent on the existence of the so-called "requirement." Therefore, it is unclear how the Examiner believes this statement provides a reason in support of the obviousness of claim 1.

Galbraith and Canterberry also do not teach or suggest the limitation of "the fire suppression system configured to dispel, at an exit thereof, the inert gas mixture to provide a dispelled inert gas mixture into a space, the dispelled inert gas mixture comprising carbon dioxide in a concentration substantially equal to the concentration pyrotechnically produced by the at least one gas generant." Galbraith does not teach or suggest this limitation because Galbraith does not teach or suggest relative amounts of the produced combustion gases or relative amounts of the combustion gases that are directed from the apparatus and into the environment.

Galbraith also does not teach or suggest this limitation because the apparatus of Galbraith includes cooling material 38, magnesium carbonate containing propellant 72, and/or magnesium carbonate cooling bed 76, each of which produces CO_2 when heated, which occurs upon ignition of the solid propellant 14, *i.e.*, when the apparatus of Galbraith is used. The CO_2 produced by the cooling material 38, magnesium carbonate containing propellant 72, and/or magnesium carbonate cooling bed 76 is in addition to the CO_2 produced by ignition of the solid propellant 14. The CO_2 from both sources exits the apparatus and is used to suppress the fire. Since the gases exiting the apparatus of Galbraith include CO_2 that is not pyrotechnically produced by the solid propellant 14, Galbraith does not teach or suggest that "the dispelled inert gas mixture compris[es] carbon dioxide in a concentration substantially equal to the concentration pyrotechnically produced by the at least one gas generant." Rather, Galbraith clearly teaches that carbon dioxide in addition to that produced by combustion of the solid propellant 14 exits the apparatus.

The Examiner states that "[s]ince the [g]as generant of Galbraith produces CO2 of a certain concentration when ignited, the CO2 concentration [in] the inert gas mixture dispelled would be substantially equal to the CO2 concentration produced by the gas generant." Final Office Action, p. 7. However, the Examiner overlooks the teachings of Galbraith that additional CO_2 is produced by the cooling material 38, magnesium carbonate containing propellant 72, and/or magnesium carbonate cooling bed 76. Furthermore, the Examiner has not provided a specific response to Appellants' arguments regarding the additional production of CO_2 from the cooling material 38, magnesium carbonate containing propellant 72, and/or magnesium carbonate cooling bed 76, which exits the apparatus along with the CO_2 produced by the combustion of the solid propellant 14. Therefore, contrary to the Examiner's assertion, Galbraith clearly does not support the Examiner's statement.

Canterberry does not cure the deficiencies in Galbraith because Canterberry is silent about details of a fire suppression device and its operation. Therefore, Canterberry also does not teach or suggest this limitation.

Furthermore, the Examiner has not identified any portion of Galbraith or Canterberry that teaches or suggests the above-mentioned limitation. While the Examiner states that "the gas generant [of Galbraith is] formulated to pyrotechnically produce an inert gas mixture comprising carbon dioxide in a concentration equal to the concentration pyrotechnically produced by the at least one gas generant," this is not the language actually recited in claim 1. Office Action of August 13, 2009, p. 2. Rather, claim 1 recites that the dispelled inert gas mixture, not the inert gas mixture pyrotechnically produced by the gas generant, comprises carbon dioxide in a concentration substantially equal to the concentration pyrotechnically produced by the at least

one gas generant.

In addition, there is no reason in the applied references, common knowledge, or the nature of the problem itself to modify the references in the manner asserted by the Examiner. The Examiner states "[i]t would have been obvious . . . to have modified the device of Galbraith et al. by using a non-azide, non-azole composition to produce an inert gas mixture as has been taught by Canterberry et al. to produce a safe gas mixture." Final Office Action, p. 3. However, even if the apparatus of Galbraith was modified to include the composition of Canterberry, the claimed invention would not be produced because the modified apparatus of Galbraith would include cooling material 38, magnesium carbonate containing propellant 72, and/or magnesium carbonate cooling bed 76. Therefore, the modified apparatus of Galbraith would produce CO_2 in addition to that pyrotechnically produced by the solid propellant. Furthermore, the modified apparatus of Galbraith would not be configured to dispel an inert gas mixture, the dispelled inert gas mixture comprising carbon dioxide in a concentration substantially equal to the concentration pyrotechnically produced by the at least one gas generant because the carbon dioxide exiting the modified apparatus of Galbraith would include carbon dioxide that is not pyrotechnically produced in addition to carbon dioxide that is produced by combustion of the solid propellant 14.

Furthermore, there is no reason to combine Galbraith and Canterberry to produce the claimed invention because nothing in either of the references provides any reason to produce a fire suppression system that is "man-rated" in that the system includes a composition formulated to pyrotechnically produce, when combusted, carbon dioxide at a concentration less than or equal to the Immediately Harmful to Life or Health concentration of carbon dioxide and that dispels an inert gas mixture comprising carbon dioxide at a concentration less than or equal to the

Immediately Harmful to Life or Health concentration of carbon dioxide. Rather, the problem to be solved in Galbraith is to produce a fire suppression system that is less environmentally hazardous than halon, while the problem to be solved in Canterberry is to develop a gas generant with less toxicity than azide and to reduce the production of undesirable gases, such as nitrogen oxides and carbon monoxide. There is no teaching in Galbraith or Canterberry that would have provided a reason to a person of ordinary skill in the art to combine the references to produce a fire suppression system as recited in claim 1. Since the problems to be solved in Galbraith and Canterberry are so different from the problem to be solved by the claimed invention, a person of ordinary skill in the art would not have a reason to combine Galbraith and Canterberry to produce a fire suppression system that is man-rated or configured for use in a room or vehicle occupied by humans, as described in the '088 Application at least at paragraph [0020]. Therefore, the obviousness rejection can only be an improper hindsight attempt to gather elements for bringing them together with the benefit of Applicants' disclosure.

For the foregoing reasons, claim 1 is allowable over Galbraith and Canterberry.

Dependent claims 2-5, 7-14, 18, 22-25, 96-100, and 115 are allowable, *inter alia*, as depending from allowable claim 1.

2. Claims 57-65, 69, 72-75, 77, 78, and 101-106

Galbraith and Canterberry, alone or in combination, do not teach or suggest all of the limitations of independent claim 57 because neither reference teaches or suggests the limitations of "igniting at least one non-azide, non-azole, non-aminoguanidine nitrate, non-

triaminoguanidine nitrate gas generant to produce an inert gas mixture comprising carbon dioxide" and "dispersing the inert gas mixture into a space to extinguish a fire, the dispersed inert gas mixture comprising carbon dioxide in a concentration substantially equal to the concentration produced by ignition of the at least one gas generant such that the space comprises carbon dioxide at a concentration less than or equal to the Immediately Harmful to Life or Health concentration of carbon dioxide." Galbraith and Canterberry do not teach or suggest these limitations for substantially the same reasons as discussed in section F.1 with respect to claim 1.

The Examiner states that "[t]he device [of Galbraith] will carry out the methods of claims 57-61." Final Office Action, p. 3. However, this one sentence, conclusory statement is not sufficient to establish a *prima facie* case of obviousness because the language actually recited in claim 57 includes method limitations, not structural limitations. Therefore, relying on the applied references as teaching the method limitations of claim 57 merely because the device of Galbraith will allegedly carry out the claimed method does not support a conclusion of obviousness.

In addition, there is no reason in the applied references, common knowledge, or the nature of the problem itself to modify the references in the manner asserted by the Examiner for substantially the same reasons as discussed in section F.1 with respect to claim 1.

For the foregoing reasons, claim 57 is allowable over Galbraith and Canterberry.

Dependent claims 58-65, 69, 72-75, 77, 78, and 101-106 are allowable, *inter alia*, as depending from allowable claim 57.

3. Claim 116

Galbraith and Canterberry, alone or in combination, do not teach or suggest the limitation in independent claim 116 of "the fire suppression system configured to dispel, at an exit thereof, the first gas mixture and a second gas mixture comprising carbon dioxide into a space to provide carbon dioxide at a concentration less than or equal to the Immediately Harmful to Life or Health concentration of carbon dioxide in the space." Galbraith does not teach or suggest this limitation because CO_2 is produced by the cooling material 38, magnesium carbonate containing propellant 72, or magnesium carbonate cooling bed 76, and the solid propellant 14. Nothing in Galbraith teaches or suggests that the CO_2 produced by the cooling material 38, magnesium carbonate containing propellant 72, or magnesium carbonate cooling bed 76 combined with the CO_2 produced by the solid propellant 14 is dispelled into a space at a concentration less than or equal to the Immediately Harmful to Life or Health concentration of carbon dioxide. Rather, since the gases exiting the apparatus of Galbraith include CO_2 from both sources, the CO_2 dispelled by the apparatus would be at a concentration greater than the Immediately Harmful to Life or Health concentration of carbon dioxide.

Canterberry does not cure the deficiency in Galbraith because Canterberry is silent about details of a fire suppression device and its operation. Therefore, Canterberry does not teach or suggest a fire suppression system that is configured to dispel, at an exit thereof, the first gas mixture and a second gas mixture comprising carbon dioxide into a space to provide carbon dioxide at a concentration less than or equal to the Immediately Harmful to Life or Health concentration of carbon dioxide in the space. Furthermore, as described in section F.1, while Canterberry teaches the amount of carbon dioxide produced by combustion of gas generating

compositions that include an azole fuel, Canterberry does not teach or suggest the amount of carbon dioxide produced by a non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant. While Canterberry teaches that oxamide may be used as the fuel, Canterberry does not teach or suggest specific compositions that include oxamide. Therefore, Canterberry does not teach or suggest the amounts of carbon dioxide produced upon combustion of a composition that includes oxamide. Furthermore, one of ordinary skill in the art would expect an oxamide-containing composition, upon combustion, to produce a greater amount of carbon dioxide than is produced by a similar composition that contains 5-aminotetrazole for the reasons previously described in section F.1 with respect to claim 1.

In addition, there is no reason in the applied references, common knowledge, or the nature of the problem itself to modify the references in the manner asserted by the Examiner for substantially the same reasons as discussed in section F.1 with respect to claim 1.

For the foregoing reasons, claim 116 is allowable over Galbraith and Canterberry.

4. Claim 117

Galbraith and Canterberry, alone or in combination, do not teach or suggest all of the limitations of independent claim 117 because neither reference teaches or suggests the limitation of "the fire suppression system configured to dispel, at an exit thereof, at least a portion of the inert gas mixture, the dispelled inert gas mixture comprising carbon dioxide in a concentration equal to the concentration pyrotechnically produced by the at least one non-azide, non-azole gas generant." Galbraith does not teach or suggest this limitation for substantially the same reasons

as discussed in sections F. 1 and F.3 with respect to claims 1 and 116. Specifically, Galbraith does not teach or suggest that the inert gas mixture, which its apparatus is configured to dispel, comprises carbon dioxide in a concentration equal to the concentration pyrotechnically produced by the solid propellant of Galbraith. Rather, Galbraith teaches that additional CO_2 produced from the cooling material 38, magnesium carbonate containing propellant 72, or magnesium carbonate cooling bed 76 exits the apparatus of Galbraith along with the CO_2 produced from combustion of the solid propellant 14. Canterberry does not cure the deficiency in Galbraith because Canterberry does not teach that the fire suppression system is configured to dispel, at an exit thereof, at least a portion of the inert gas mixture, the dispelled inert gas mixture comprising carbon dioxide in a concentration equal to the concentration pyrotechnically produced by the at least one non-azide, non-azole gas generant.

In addition, there is no reason in the applied references, common knowledge, or the nature of the problem itself to modify the references in the manner asserted by the Examiner for substantially the same reasons as discussed in section F.1 with respect to claim 1.

For the foregoing reasons, claim 117 is allowable over Galbraith and Canterberry.

5. Claims 118 and 119

Galbraith and Canterberry, alone or in combination, do not teach or suggest all of the limitations of independent claim 118 because neither reference teaches or suggests the limitation of "the fire suppression system configured to dispel, at an exit thereof, the inert gas mixture as pyrotechnically produced into a space, the space comprising carbon dioxide at less than approximately 4% by volume." Galbraith and Canterberry do not teach or suggest these

limitations for substantially the same reasons as discussed in sections F.1 and F.3 with respect to claims 1 and 116.

For the foregoing reasons, claim 118 is allowable over Galbraith and Canterberry.

Dependent claim 119 is allowable, *inter alia*, as depending from allowable claim 118.

For the foregoing reasons, Appellants respectfully request that the obviousness rejection of claims 1-5, 7-14, 18, 22-25, 57-65, 69, 72-75, 77, 78, 96-106, and 115-119 be overturned, and that each of these claims be allowed.

G. Claims 15, 70, 79, 80, 94, and 95 are not obvious over Galbraith in view of Canterberry, and further in view of Taylor and Moore

Claims 15, 70, 79, 80, 94, and 95 stand rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over Galbraith in view of Canterberry, and further in view of Taylor and Moore.

1. Claims 15 and 70

Claims 15 and 70 are dependent claims that include all of the limitations of claims 1 and 57, respectively. The applied references, when combined, do not teach or suggest all of the limitations of claims 15 and 70 because Taylor and Moore do not cure the deficiencies in Galbraith and Canterberry that are described in sections F.1 and F. 2.

Furthermore, the nonobviousness of independent claims 1 and 57 precludes a rejection of claims 15 and 70, which depend therefrom, because a dependent claim is obvious only if the

independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claims 15 and 70 are allowable, *inter alia*, as depending from an allowable base claim.

2. Claim 79

Claim 79 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 79 because Taylor and Moore do not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 79, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 79 is allowable, *inter alia*, as depending from an allowable base claim.

3. Claim 80

Claim 80 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 80 because Taylor and Moore do not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 80, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 80 is allowable, *inter alia*, as depending from an allowable base claim.

4. Claim 94

Claim 94 is a dependent claim that includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 94 because Taylor and Moore do not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 94, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 94 is allowable, *inter alia*, as depending from an allowable base claim.

5. Claim 95

Claim 95 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest

all of the limitations of claim 95 because Taylor and Moore do not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 95, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 95 is allowable, *inter alia*, as depending from an allowable base claim.

For the foregoing reasons, Appellants respectfully request that the obviousness rejection of claims 15, 70, 79, 80, 94, and 95 be overturned, and that each of these claims be allowed.

H. Claims 16, 71, and 81-90 are not obvious over Galbraith in view of Canterberry and further in view of Taylor and Hinshaw

Claims 16, 71, and 81-90 stand rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over Galbraith in view of Canterberry, and further in view of Taylor and Moore.

1. Claims 16 and 71

Claims 16 and 71 are dependent claims that include all of the limitations of claims 1 and 57, respectively. The applied references, when combined, do not teach or suggest all of the limitations of claims 16 and 71 because Taylor and Hinshaw do not cure the deficiencies in Galbraith and Canterberry that are described in sections F.1 and F. 2.

Furthermore, the nonobviousness of independent claims 1 and 57 precludes a rejection of claims 16 and 71, which depend therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claims 16 and 71 are allowable, *inter alia*, as depending from an allowable base claim.

2. Claims 81, 85, and 89

Claims 81 and 85 are dependent claims that include all of the limitations of claim 1 and claim 89 is a dependent claim that includes all of the limitations of claim 57. The applied references, when combined, do not teach or suggest all of the limitations of claims 81, 85, and 89 because Taylor and Hinshaw do not cure the deficiencies in Galbraith and Canterberry that are described in sections F.1 and F. 2.

Furthermore, the nonobviousness of independent claims 1 and 57 precludes a rejection of claims 81, 85, and 89, which depend therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claims 81, 85, and 89 are allowable, *inter alia*, as depending from an allowable base claim.

3. Claims 82, 86, and 90

Claims 82 and 86 are dependent claims that include all of the limitations of claim 1 and claim 90 is a dependent claim that includes all of the limitations of claim 57. The applied references, when combined, do not teach or suggest all of the limitations of claims 82, 86, and 90 because Taylor and Hinshaw do not cure the deficiencies in Galbraith and Canterberry that are described in sections F.1 and F. 2.

Furthermore, the nonobviousness of independent claims 1 and 57 precludes a rejection of claims 82, 86, and 90, which depend therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claims 82, 86, and 90 are allowable, *inter alia*, as depending from an allowable base claim.

4. Claims 83 and 87

Claims 83 and 87 are dependent claims that include all of the limitations of claims 1 and 57, respectively. The applied references, when combined, do not teach or suggest all of the limitations of claims 83 and 87 because Taylor and Hinshaw do not cure the deficiencies in Galbraith and Canterberry that are described in sections F.1 and F. 2.

Furthermore, the nonobviousness of independent claims 1 and 57 precludes a rejection of claims 83 and 87, which depend therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claims 83 and 87 are allowable, *inter alia*, as depending from an allowable base claim.

5. Claims 84 and 88

Claims 84 and 88 are dependent claims that include all of the limitations of claims 1 and 57, respectively. The applied references, when combined, do not teach or suggest all of the limitations of claims 84 and 88 because Taylor and Hinshaw do not cure the deficiencies in Galbraith and Canterberry that are described in sections F.1 and F. 2.

Furthermore, the nonobviousness of independent claims 1 and 57 precludes a rejection of claims 84 and 88, which depend therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claims 84 and 88 are allowable, *inter alia*, as depending from an allowable base claim.

For the foregoing reasons, Appellants respectfully request that the obviousness rejection of claims 16, 71, and 81-90 be overturned, and that each of these claims be allowed.

I. Claims 19-21 and 76 are not obvious over Galbraith in view of Canterberry, and further in view of Knowlton

Claims 19-21 and 76 stand rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over Galbraith in view of Canterberry, and further in view of Knowlton.

1. Claims 19 and 76

Claims 19 and 76 are dependent claims that include all of the limitations of claims 1 and 57, respectively. The applied references, when combined, do not teach or suggest all of the limitations of claims 19 and 76 because Knowlton does not cure the deficiencies in Galbraith and Canterberry that are described in sections F.1 and F. 2.

Furthermore, the nonobviousness of independent claims 1 and 57 precludes a rejection of claims 19 and 76, which depend therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Claims 19 and 76 are further allowable because the applied references do not teach or suggest a heat management system that comprises a phase change material (claim 19) or flowing the inert gas mixture over a phase change material (claim 76). While Knowlton suggests lithium nitrate, sodium nitrate, or potassium nitrate are present in an autoignition composition, Knowlton does not teach or suggest that these components are present in a "heat management system positioned and configured to reduce a temperature of the inert gas mixture," as recited in claim 3, upon which claim 19 depends. Rather, the autoignition composition of Knowlton produces heat to initiate combustion of the gas generator composition of Knowlton. Claim 76, which depends from claim 74, is allowable because Knowlton does not teach or suggest flowing the inert gas mixture over a phase change material.

Therefore, dependent claims 19 and 76 are allowable, *inter alia*, as depending from an allowable base claim.

2. Claim 20

Claim 20 is a dependent claim that includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 20 because Knowlton does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 20, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Claim 20 is further allowable because the applied references do not teach or suggest that the phase change material in the heat management system comprises lithium nitrate, sodium nitrate, potassium nitrate, or mixtures thereof. Since the applied references do not teach or suggest a phase change material, for the reasons described in section I.1, the applied references necessarily do not teach or suggest that the phase change material in the heat management system comprises lithium nitrate, sodium nitrate, potassium nitrate, or mixtures thereof. While Knowlton suggests lithium nitrate, sodium nitrate, or potassium nitrate are present in an autoignition composition, Knowlton does not teach or suggest that these components are present in a "heat management system positioned and configured to reduce a temperature of the inert gas mixture," as recited in claim 3, upon which claim 20 indirectly depends. Rather, the autoignition composition of Knowlton produces heat to initiate combustion of the gas generator composition of Knowlton.

Therefore, dependent claim 20 is allowable, *inter alia*, as depending from an allowable base claim.

3. Claim 21

Claim 21 is a dependent claim that includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 21 because Knowlton does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 21, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Claim 21 is further allowable because the applied references do not teach or suggest that the fire suppression system is configured to transfer heat from the inert gas mixture to the phase change material. Since the applied references do not teach or suggest a phase change material, for the reasons described in section I.1, the applied references necessarily do not teach or suggest that the fire suppression system is configured to transfer heat from the inert gas mixture to the phase change material. While Knowlton suggests lithium nitrate, sodium nitrate, or potassium nitrate are present in an autoignition composition, Knowlton does not teach or suggest that these components are present in a "heat management system positioned and configured to reduce a temperature of the inert gas mixture," as recited in claim 3, upon which claim 21 indirectly

depends. Rather, the autoignition composition of Knowlton produces heat to initiate combustion of the gas generator composition of Knowlton.

Therefore, dependent claim 21 is allowable, *inter alia*, as depending from an allowable base claim.

For the foregoing reasons, Appellants respectfully request that the obviousness rejection of claims 19-21 and 76 be overturned, and that each of these claims be allowed.

J. Claims 26-28, 31-45, 48, 49, and 53-56 are not obvious over Galbraith in view of Canterberry, and further in view of Drakin

Claims 26-28, 31-45, 48, 49, and 53-56 stand rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over Galbraith in view of Canterberry, and further in view of Drakin.

1. Claim 26

Claim 26 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 26 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 26, which depends therefrom, because a dependent claim is obvious only if the independent

claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 26 is allowable, *inter alia*, as depending from an allowable base claim.

2. Claim 27

Claim 27 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 27 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 27, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 27 is allowable, *inter alia*, as depending from an allowable base claim.

3. Claim 28

Claim 28 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 28 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 28, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 28 is allowable, *inter alia*, as depending from an allowable base claim.

4. Claim 31

Claim 31 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 31 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 31, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 31 is allowable, *inter alia*, as depending from an allowable base claim.

5. Claim 32

Claim 32 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest

all of the limitations of claim 32 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 32, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 32 is allowable, *inter alia*, as depending from an allowable base claim.

6. Claim 33

Claim 33 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 33 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 33, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 33 is allowable, *inter alia*, as depending from an allowable base claim.

7. Claim 34

Claim 34 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 34 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 34, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 34 is allowable, *inter alia*, as depending from an allowable base claim.

8. Claim 35

Claim 35 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 35 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 35, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 35 is allowable, *inter alia*, as depending from an allowable base claim.

9. Claim 36

Claim 36 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 36 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 36, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 36 is allowable, *inter alia*, as depending from an allowable base claim.

10. Claim 37

Claim 37 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 37 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 37, which depends therefrom, because a dependent claim is obvious only if the independent

claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 37 is allowable, *inter alia*, as depending from an allowable base claim.

11. Claim 38

Claim 38 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 38 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 38, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 38 is allowable, *inter alia*, as depending from an allowable base claim.

12. Claim 39

Claim 39 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 39 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 39, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 39 is allowable, *inter alia*, as depending from an allowable base claim.

13. Claim 40

Claim 40 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 40 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 40, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 40 is allowable, *inter alia*, as depending from an allowable base claim.

14. Claim 41

Claim 41 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest

all of the limitations of claim 41 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 41, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 41 is allowable, *inter alia*, as depending from an allowable base claim.

15. Claim 42

Claim 42 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 42 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 42, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 42 is allowable, *inter alia*, as depending from an allowable base claim.

16. Claim 43

Claim 43 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 43 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 43, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 43 is allowable, *inter alia*, as depending from an allowable base claim.

17. Claim 44

Claim 44 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 44 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 44, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 44 is allowable, *inter alia*, as depending from an allowable base claim.

18. Claim 45

Claim 45 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 45 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 45, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 45 is allowable, *inter alia*, as depending from an allowable base claim.

19. Claim 48

Claim 48 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 48 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 48, which depends therefrom, because a dependent claim is obvious only if the independent

claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 48 is allowable, *inter alia*, as depending from an allowable base claim.

20. Claim 49

Claim 49 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 49 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 49, which respectively depend therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 49 is allowable, *inter alia*, as depending from an allowable base claim.

21. Claim 53

Claim 53 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 53 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 53, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 53 is allowable, *inter alia*, as depending from an allowable base claim.

22. Claim 54

Claim 54 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 54 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 54, which respectively depend therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 54 is allowable, *inter alia*, as depending from an allowable base claim.

23. Claim 55

Claim 55 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest

all of the limitations of claim 55 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 55, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 55 is allowable, *inter alia*, as depending from an allowable base claim.

24. Claim 56

Claim 56 is a dependent claim that indirectly depends on claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 56 because Drakin does not cure the deficiencies in Galbraith and Canterberry that are described in section F.1.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 56, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 56 is allowable, *inter alia*, as depending from an allowable base claim.

For the foregoing reasons, Appellants respectfully request that the obviousness rejection of claims 26-28, 31-45, 48, 49, and 53-56 be overturned, and that each of these claims be allowed.

K. Claim 46 is unpatentable over Galbraith in view of Canterberry, and Drakin, and further in view of Taylor and Moore

Claim 46 stands rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over Galbraith in view of Canterberry and Drakin, and further in view of Taylor and Moore.

Claim 46 is a dependent claim that includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 46 because Taylor and Moore do not cure the deficiencies in Galbraith, Canterberry, and Drakin that are described in sections F.1 and J.1-J.24.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 46, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

For the foregoing reasons, Appellants respectfully request that the obviousness rejection of claim 46 be overturned, and the claim be allowed.

L. Claim 47 is not obvious over Galbraith in view of Canterberry, and Drakin, and further in view of Taylor, and Hinshaw

Claim 47 stands rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over Galbraith in view of Canterberry and Drakin, and further in view of Taylor and Hinshaw.

Claim 47 is a dependent claim that includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 47 because Taylor and Hinshaw do not cure the deficiencies in Galbraith, Canterberry, and Drakin that are described in sections F.1 and J.1-J.24.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 47, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

For the foregoing reasons, Appellants respectfully request that the obviousness rejection of claim 47 be overturned, and that the claim be allowed.

M. Claims 50-52 and 76 are not obvious over Galbraith in view of Canterberry and Drakin, and further in view of Knowlton

Claims 50-52 and 76 stand rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over Galbraith in view of Canterberry and Drakin, and further in view of Knowlton.

1. Claims 50 and 76

Claims 50 and 76 are dependent claims that depend indirectly on claims 1 and 57, respectively, and, therefore, include all of the limitations of claims 1 and 57, respectively. The applied references, when combined, do not teach or suggest all of the limitations of claims 50 and 76 because Knowlton does not cure the deficiencies in Galbraith, Canterberry, and Drakin that are described in sections F.1, F.2, and J.1-J.24

Furthermore, the nonobviousness of independent claims 1 and 57 precludes a rejection of claims 50 and 76, which depend therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claims 50 and 76 are allowable, *inter alia*, as depending from an allowable base claim.

2. Claim 51

Claim 51 is a dependent claim that indirectly depends of claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 51 because Knowlton does not cure the deficiencies in Galbraith, Canterberry, and Drakin that are described in sections F.1 and J.1-J.24.

Claim 51 is further allowable because the applied references do not teach or suggest that the phase change material in the heat management system comprises lithium nitrate, sodium nitrate, potassium nitrate, or mixtures thereof. Since the applied references do not teach or suggest a phase change material, for the reasons described in section I.1, the applied references

necessarily do not teach or suggest that the phase change material in the heat management system comprises lithium nitrate, sodium nitrate, potassium nitrate, or mixtures thereof. While Knowlton suggests lithium nitrate, sodium nitrate, or potassium nitrate are present in an autoignition composition, Knowlton does not teach or suggest that these components are present in a "heat management system positioned and configured to reduce a temperature of the inert gas mixture," as recited in claim 3, upon which claim 51 indirectly depends. Rather, the autoignition composition of Knowlton produces heat to initiate combustion of the gas generator composition of Knowlton.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 51, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 51 is allowable, *inter alia*, as depending from an allowable base claim.

3. Claim 52

Claim 52 is a dependent claim that indirectly depends of claim 1 and, therefore, includes all of the limitations of claim 1. The applied references, when combined, do not teach or suggest all of the limitations of claim 52 because Knowlton does not cure the deficiencies in Galbraith, Canterberry, and Drakin that are described in sections F.1 and J.1-J.24.

Claim 52 is further allowable because the applied references do not teach or suggest that heat is transferred from the inert gas mixture to the phase change material. Since the applied

references do not teach or suggest a phase change material, for the reasons described in section I.1, the applied references necessarily do not teach or suggest that heat is transferred from the inert gas mixture to the phase change material. While Knowlton suggests lithium nitrate, sodium nitrate, or potassium nitrate are present in an autoignition composition, Knowlton does not teach or suggest that these components are present in a "heat management system positioned and configured to reduce a temperature of the inert gas mixture," as recited in claim 3, upon which claim 52 indirectly depends. Rather, the autoignition composition of Knowlton produces heat to initiate combustion of the gas generator composition of Knowlton.

Furthermore, the nonobviousness of independent claim 1 precludes a rejection of claim 52, which depends therefrom, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* M.P.E.P. § 2143.03.

Therefore, dependent claim 52 is allowable, *inter alia*, as depending from an allowable base claim.

For the foregoing reasons, Appellants respectfully request that the obviousness rejection of claims 50-52 and 76 be overturned, and that each of these claims be allowed.

N. Claims 107-114 are not obvious over Galbraith in view of Canterberry, and further in view of Hinshaw

Claims 107-114 stand rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over Galbraith in view of Canterberry, and further in view of Hinshaw.

The obviousness rejection of claims 107-114 is improper because the applied references do not teach or suggest all of the claim limitations. In addition, there is no reason in the applied references, common knowledge, or the nature of the problem itself to combine the applied references in the manner asserted by the Examiner.

The applied references do not teach or suggest the limitation in claim 107 of "the fire suppression system configured to dispense, at an exit thereof, the inert gas mixture comprising carbon dioxide in a concentration substantially equal to the concentration pyrotechnically produced by the at least one gas generant." Galbraith and Canterberry do not teach or suggest this limitation for substantially the same reasons as discussed in section F.1 for claim 1. Hinshaw does not cure this deficiency in Galbraith and Canterberry because nothing in Hinshaw teaches a fire suppression system that is configured to dispense an inert gas mixture comprising carbon dioxide in a concentration substantially equal to the concentration pyrotechnically produced by the at least one gas generant.

In addition, there is no reason in the applied references, common knowledge, or the nature of the problem itself to modify the references in the manner asserted by the Examiner. The Examiner states "[i]t would have been obvious . . . to have made the gas generant of Galbraith and Canterberry et al. comprising a combination of the elements as taught by Taylor et al. and Hinshaw et al. since Taylor et al. and Hinshaw et al. teach such elements for forming a gas generant are know[n] in the art and the combination of these elements would properly form a gas generant." Office Action of August 13, 2009, p. 7. While the Examiner's reason for combining the applied references refers to Taylor, Appellants have treated the obviousness rejection as being in light of Galbraith, Canterberry, and Hinshaw since the Examiner did not

specifically reference Taylor in other portions of the obviousness rejection. Since nothing in Galbraith, Canterberry, or Hinshaw teaches or suggests the desirability of the combination, the Examiner's reason for combining the applied references appears to be a hindsight attempt to gather elements for bringing them together with the benefit of Appellants' disclosure.

For the foregoing reasons, claim 107 is allowable over Galbraith and Canterberry.

Dependent claims 108-114 are allowable, *inter alia*, as depending from an allowable base claim.

For the foregoing reasons, Appellants respectfully request that the obviousness rejection of claims 107-114 be overturned, and that each of these claims be allowed.

8. CLAIMS APPENDIX

A copy of claims 1-5, 7-16, 18-67, 69-90, and 94-119 is appended hereto as Appendix A.

9. EVIDENCE APPENDIX

NONE

10. RELATED PROCEEDINGS APPENDIX

A Notice of Panel Decision from Pre-Appeal Brief Review in the '088 Application and a decision rendered by the Board in Appeal No. 2002-0304 are included in a RELATED PROCEEDINGS APPENDIX accompanying this Appeal Brief.

CONCLUSION

Appellants respectfully request the reversal of the rejections of currently pending claims 1-5, 7-16, 18-67, 69-90, and 94-119 for the reasons set forth above.

Respectfully submitted,

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APPENDIX A

CLAIMS APPENDIX

Claims 1-5, 7-16, 18-67, 69-90, and 94-119

U.S. Patent Application No. 10/727,088

Filed December 2, 2003

1. A fire suppression system, comprising:

a chamber and at least one gas generant housed therein, the at least one gas generant comprising a non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate composition formulated to pyrotechnically produce no sodium chloride and an inert gas mixture comprising carbon dioxide at a concentration less than or equal to the Immediately Harmful to Life or Health concentration of carbon dioxide,

the fire suppression system configured to dispel, at an exit thereof, the inert gas mixture to provide a dispelled inert gas mixture into a space, the dispelled inert gas mixture comprising carbon dioxide in a concentration substantially equal to the concentration pyrotechnically produced by the at least one gas generant.

2. The fire suppression system of claim 1, further comprising an igniter composition in contact with the at least one gas generant.

3. The fire suppression system of claim 1, further comprising a heat management system positioned and configured to reduce a temperature of the inert gas mixture.

4. The fire suppression system of claim 1, wherein the at least one gas generant is formulated to produce at least one gaseous combustion product and at least one solid combustion product when combusted.

5. The fire suppression system of claim 1, wherein the at least one gas generant is formulated to produce minimal amounts of carbon monoxide, particulates, or smoke when combusted.

7. The fire suppression system of claim 1, wherein the at least one gas generant is formulated to produce less than 1 percent of an original weight of the at least one gas generant in particulates or smoke.

8. The fire suppression system of claim 4, wherein substantially all of the at least one gaseous combustion product forms the inert gas mixture.

9. The fire suppression system of claim 4, wherein the at least one solid combustion product is formulated to minimize production of particulates during combustion of the at least one gas generant.

10. The fire suppression system of claim 4, wherein the at least one solid combustion product is a slag.

11. The fire suppression system of claim 1, wherein the inert gas mixture comprises nitrogen and water.

12. The fire suppression system of claim 1, wherein the at least one gas generant comprises an oxidizer, a fuel, and a binder.

13. The fire suppression system of claim 1, wherein the at least one gas generant is formed into a geometry that provides a neutral burn when combusted.

14. The fire suppression system of claim 1, wherein the at least one gas generant further comprises at least one of an oxidizing agent, an ignition enhancer, a ballistic modifier, a slag enhancing agent, a cooling agent, and a binder.

15. The fire suppression system of claim 1, wherein the at least one gas generant comprises hexa(ammine)cobalt(III)-nitrate, cuprous oxide, and titanium dioxide.

16. The fire suppression system of claim 1, wherein the at least one gas generant comprises hexa(ammine)cobalt(III)-nitrate, cupric oxide, titanium dioxide, and polyacrylamide.

18. The fire suppression system of claim 3, wherein the heat management system comprises a heat sink.

19. The fire suppression system of claim 3, wherein the heat management system comprises a phase change material.

20. The fire suppression system of claim 19, wherein the phase change material comprises lithium nitrate, sodium nitrate, potassium nitrate, or mixtures thereof.

21. The fire suppression system of claim 19, wherein the fire suppression system is configured to transfer heat from the inert gas mixture to the phase change material.

22. The fire suppression system of claim 1, wherein the fire suppression system is configured to disperse the inert gas mixture therefrom within from approximately 20 seconds to approximately 60 seconds after ignition of the at least one gas generant.

23. The fire suppression system of claim 1, further comprising at least one diffuser plate to disperse the inert gas mixture.

24. The fire suppression system of claim 23, wherein the at least one diffuser plate is configured and positioned to diffuse the inert gas mixture into a heat management system.

25. The fire suppression system of claim 23, wherein the at least one diffuser plate is configured and positioned to disperse the inert gas mixture exiting from the fire suppression system.

26. The fire suppression system of claim 3, wherein the gas generant is configured into at least one pellet and is present in a combustion chamber and wherein the heat management system comprises an effluent train.

27. The fire suppression system of claim 26, wherein the combustion chamber comprises an igniter composition in contact with the at least one gas generant.

28. The fire suppression system of claim 27, wherein the igniter composition is formulated and of sufficient mass to produce an amount of heat sufficient to ignite the at least one gas generant.

29. The fire suppression system of claim 27, wherein the igniter composition comprises from approximately 15% to approximately 30% boron and from approximately 70% to approximately 85% potassium nitrate.

30. The fire suppression system of claim 27, wherein the igniter composition comprises strontium nitrate, magnesium, and an organic binder.

31. The fire suppression system of claim 27, wherein the igniter composition is formulated to produce solid combustion products when combusted.

32. The fire suppression system of claim 26, wherein the at least one pellet is formed into a shape that provides a neutral burn.

33. The fire suppression system of claim 26, wherein the at least one pellet further comprises an igniter composition.

34. The fire suppression system of claim 33, wherein the igniter composition and the at least one gas generant are compressed together in the at least one pellet.

35. The fire suppression system of claim 26, wherein the at least one pellet has a total mass sufficient to produce an amount of the inert gas mixture sufficient to extinguish a fire.

36. The fire suppression system of claim 26, wherein the at least one gas generant is formulated to produce minimal amounts of carbon monoxide, particulates, or smoke when combusted.

37. The fire suppression system of claim 26, wherein the at least one gas generant is formulated to produce less than an Immediately Harmful to Life or Health concentration of ammonia, carbon monoxide, or nitrogen oxides and less than 1 percent of an original weight of the at least one gas generant in particulates or smoke.

38. The fire suppression system of claim 26, wherein the at least one gas generant is formulated to produce at least one gaseous combustion product and at least one solid combustion product when combusted.

39. The fire suppression system of claim 38, wherein substantially all of the at least one gaseous combustion product forms the inert gas mixture.

40. The fire suppression system of claim 38, wherein the at least one solid combustion product is formulated to minimize production of particulates during combustion of the at least one gas generant.

41. The fire suppression system of claim 38, wherein the at least one solid combustion product produced by combustion of the at least one gas generant is a slag.

42. The fire suppression system of claim 41, wherein the slag is present on a surface of the at least one pellet.

43. The fire suppression system of claim 26, wherein the inert gas mixture comprises nitrogen and water.

44. The fire suppression system of claim 26, wherein the at least one gas generant comprises an oxidizer, a fuel, and a binder.

45. The fire suppression system of claim 26, wherein the at least one gas generant further comprises at least one of an oxidizing agent, an ignition enhancer, a ballistic modifier, a slag enhancing agent, a cooling agent, and a binder.

46. The fire suppression system of claim 26, wherein the at least one gas generant comprises hexa(ammine)cobalt(III)-nitrate, cuprous oxide, and titanium dioxide.

47. The fire suppression system of claim 26, wherein the at least one gas generant comprises hexa(ammine)cobalt(III)-nitrate, cupric oxide, titanium dioxide, and polyacrylamide.

48. The fire suppression system of claim 26, wherein the heat management system is configured to reduce the temperature of the inert gas mixture.

49. The fire suppression system of claim 26, wherein the heat management system comprises a heat sink.

50. The fire suppression system of claim 26, wherein the heat management system comprises a phase change material.

51. The fire suppression system of claim 50, wherein the phase change material comprises lithium nitrate, sodium nitrate, potassium nitrate, or mixtures thereof.

52. The fire suppression system of claim 50, wherein heat from the inert gas mixture is transferred to the phase change material.

53. The fire suppression system of claim 26, wherein the fire suppression system is configured to disperse the inert gas mixture therefrom within from approximately 20 seconds to approximately 60 seconds after ignition of the at least one gas generant.

54. The fire suppression system of claim 26, further comprising at least one diffuser plate to disperse the inert gas mixture.

55. The fire suppression system of claim 54, wherein the at least one diffuser plate is configured and positioned to diffuse the inert gas mixture into the heat management system.

56. The fire suppression system of claim 54, wherein the at least one diffuser plate is configured and positioned to disperse the inert gas mixture exiting from the fire suppression system.

57. A method for fighting a fire in a space, comprising:

igniting at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant to produce an inert gas mixture comprising carbon dioxide; and

dispersing the inert gas mixture into a space to extinguish a fire, the dispersed inert gas mixture comprising carbon dioxide in a concentration substantially equal to the concentration

produced by ignition of the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant such that the space comprises carbon dioxide at a concentration less than or equal to the Immediately Harmful to Life or Health concentration of carbon dioxide.

58. The method of claim 57, wherein igniting at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant to produce an inert gas mixture comprises pyrotechnically igniting the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant to produce the inert gas mixture.

59. The method of claim 57, wherein igniting at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant to produce an inert gas mixture comprises igniting the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant to produce nitrogen and water.

60. The method of claim 57, wherein igniting at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant to produce an inert gas mixture comprises igniting the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant composition to produce gaseous combustion products and solid combustion products.

61. The method of claim 60, wherein igniting at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant to produce an inert gas mixture comprises forming the inert gas mixture with substantially all of the gaseous combustion products produced by the at least one gas generant.

62. The method of claim 57, wherein igniting at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant to produce an inert gas mixture comprises generating gaseous combustion products within from approximately 20 seconds to approximately 60 seconds after ignition of the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant.

63. The method of claim 57, wherein igniting at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant to produce an inert gas mixture comprises producing gaseous combustion products that are substantially free of nitrogen oxides.

64. The method of claim 57, wherein igniting at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant to produce an inert gas mixture comprises producing a neutral burn of the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant.

65. The method of claim 57, wherein igniting at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant to produce an inert gas mixture comprises igniting an igniter composition to produce sufficient heat to ignite the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant.

66. The method of claim 65, wherein igniting an igniter composition comprises igniting an igniter composition comprising from approximately 15% to approximately 30% boron and from approximately 70% to approximately 85% potassium nitrate.

67. The method of claim 65, wherein igniting an igniter composition comprises igniting the igniter composition comprising strontium nitrate, magnesium, and an organic binder.

69. The method of claim 57, wherein igniting at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant to produce an inert gas mixture comprises producing solid combustion products that minimize the particulates and the smoke formed by the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant.

70. The method of claim 57, wherein igniting at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant to produce an inert gas mixture comprises igniting the at least one non-azide, non-azole, non-aminoguanidine nitrate,

non-triaminoguanidine nitrate gas generant comprising hexa(ammine)cobalt(III)-nitrate, cuprous oxide, and titanium dioxide.

71. The method of claim 57, wherein igniting at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant to produce an inert gas mixture comprises igniting the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant comprising hexa(ammine)cobalt(III)-nitrate, cupric oxide, titanium dioxide, and polyacrylamide.

72. The method of claim 57, wherein dispersing the inert gas mixture into a space comprises dispersing the inert gas mixture into the space within from approximately 20 seconds to approximately 60 seconds after ignition of the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant.

73. The method of claim 57, further comprising reducing a temperature of the inert gas mixture after combustion of the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant.

74. The method of claim 73, wherein reducing a temperature of the inert gas mixture after combustion of the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant comprises exposing the inert gas mixture to a heat management system.

75. The method of claim 74, wherein exposing the inert gas mixture to a heat management system comprises flowing the inert gas mixture into a heat sink.

76. The method of claim 74, wherein exposing the inert gas mixture to a heat management system comprises flowing the inert gas mixture over a phase change material.

77. The method of claim 57, further comprising extinguishing the fire by reducing an oxygen content in the space.

78. The method of claim 77, wherein extinguishing the fire by reducing an oxygen content in the space comprises reducing the oxygen content to approximately 13% by volume.

79. The fire suppression system of claim 15, wherein the hexa(ammine)cobalt(III)-nitrate is recrystallized.

80. The fire suppression system of claim 15, wherein the hexa(ammine)cobalt(III)-nitrate comprises less than approximately 0.1% of activated charcoal or carbon.

81. The fire suppression system of claim 16, wherein the hexa(ammine)cobalt(III)-nitrate is recrystallized.

82. The fire suppression system of claim 16, wherein the hexa(ammine)cobalt(III)-nitrate comprises less than approximately 0.1% of activated charcoal or carbon.

83. The fire suppression system of claim 46, wherein the hexa(ammine)cobalt(III)-nitrate is recrystallized.

84. The fire suppression system of claim 46, wherein the hexa(ammine)cobalt(III)-nitrate comprises less than approximately 0.1% of activated charcoal or carbon.

85. The fire suppression system of claim 47, wherein the hexa(ammine)cobalt(III)-nitrate is recrystallized.

86. (Previously presented) The fire suppression system of claim 47, wherein the hexa(ammine)cobalt(III)-nitrate comprises less than approximately 0.1% of activated charcoal or carbon.

87. The method of claim 70, wherein igniting the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant comprising hexa(ammine)cobalt(III)-nitrate, cuprous oxide, and titanium dioxide comprises igniting the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant comprising recrystallized hexa(ammine)cobalt(III)-nitrate, cuprous oxide, and titanium dioxide.

88. The method of claim 70, wherein igniting the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant comprising hexa(ammine)cobalt(III)-nitrate, cuprous oxide, and titanium dioxide comprises igniting the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant comprising hexa(ammine)cobalt(III)-nitrate having less than approximately 0.1% of activated charcoal or carbon, cuprous oxide, and titanium dioxide.

89. The method of claim 71, wherein igniting the at least one gas non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate generant comprising hexa(ammine)cobalt(III)-nitrate, cupric oxide, titanium dioxide, and polyacrylamide comprises igniting the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triamino-guanidine nitrate gas generant comprising recrystallized hexa(ammine)cobalt(III)-nitrate, cupric oxide, titanium dioxide, and polyacrylamide.

90. The method of claim 71, wherein igniting the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant comprising hexa(ammine)cobalt(III)-nitrate, cupric oxide, titanium dioxide, and polyacrylamide comprises igniting the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant comprising hexa(ammine)cobalt(III)-nitrate having less than approximately 0.1% of activated charcoal or carbon, cupric oxide, titanium dioxide, and polyacrylamide.

94. The fire suppression system of claim 1, wherein the at least one gas generant comprises hexa(ammine)cobalt(III)nitrate and guanidine nitrate.

95. The fire suppression system of claim 94, wherein the at least one gas generant comprises from approximately 1% to approximately 5% guanidine nitrate.

96. The fire suppression system of claim 1, wherein the at least one gas generant is formulated to pyrotechnically produce an inert gas mixture comprising less than approximately 4% by volume of carbon dioxide.

97. The fire suppression system of claim 1, wherein the at least one gas generant is formulated to pyrotechnically produce an inert gas mixture comprising less than approximately 0.12% by volume of carbon monoxide.

98. The fire suppression system of claim 1, wherein the at least one gas generant is formulated to pyrotechnically produce an inert gas mixture comprising less than approximately 100 parts per million of nitric oxide.

99. The fire suppression system of claim 1, wherein the at least one gas generant is formulated to pyrotechnically produce an inert gas mixture comprising less than approximately 20 parts per million of nitrogen dioxide.

100. The fire suppression system of claim 1, wherein the at least one gas generant is formulated to pyrotechnically produce an inert gas mixture comprising less than approximately 300 parts per million of ammonia.

101. The method of claim 57, wherein igniting at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant to produce an inert gas mixture comprises producing the inert gas mixture comprising less than approximately 4% by volume of carbon dioxide.

102. The method of claim 57, wherein igniting at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant to produce an inert gas mixture comprises producing the inert gas mixture comprising less than approximately 0.12% by volume of carbon monoxide.

103. The method of claim 57, wherein igniting at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant to produce an inert gas mixture comprises producing the inert gas mixture comprising less than approximately 100 parts per million of nitric oxide.

104. The method of claim 57, wherein igniting at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant to produce an inert gas

mixture comprises producing the inert gas mixture comprising less than approximately 20 parts per million of nitrogen dioxide.

105. The method of claim 57, wherein igniting at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant to produce an inert gas mixture comprises producing the inert gas mixture comprising less than approximately 300 parts per million of ammonia.

106. The method of claim 57, wherein igniting at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant to produce an inert gas mixture comprises producing the inert gas mixture comprising less than approximately 1% by weight of the at least one non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant in particulates or smoke.

107. A fire suppression system, comprising:

at least one gas generant formulated to pyrotechnically produce an inert gas mixture comprising less than approximately 4% by volume of carbon dioxide, the at least one gas generant comprising hexa(ammine)cobalt(III)nitrate and guanidine nitrate,

the fire suppression system configured to dispense, at an exit thereof, the inert gas mixture comprising carbon dioxide in a concentration substantially equal to the concentration pyrotechnically produced by the at least one gas generant.

108. The fire suppression system of claim 107, wherein the at least one gas generant comprises from approximately 1% to approximately 5% guanidine nitrate.

109. The fire suppression system of claim 107, wherein the at least one gas generant is formulated to pyrotechnically produce the inert gas mixture comprising less than approximately 4% by volume of carbon dioxide.

110. The fire suppression system of claim 107, wherein the at least one gas generant is formulated to pyrotechnically produce the inert gas mixture comprising less than approximately 0.12% by volume of carbon monoxide.

111. The fire suppression system of claim 107, wherein the at least one gas generant is formulated to pyrotechnically produce the inert gas mixture comprising less than approximately 100 parts per million of nitric oxide.

112. The fire suppression system of claim 107, wherein the at least one gas generant is formulated to pyrotechnically produce the inert gas mixture comprising less than approximately 20 parts per million of nitrogen dioxide.

113. The fire suppression system of claim 107, wherein the at least one gas generant is formulated to pyrotechnically produce the inert gas mixture comprising less than approximately 300 parts per million of ammonia.

114. The fire suppression system of claim 107, wherein the at least one gas generant is formulated to produce less than 1 percent of an original weight of the at least one gas generant in particulates or smoke.

115. The fire suppression system of claim 1, wherein the fire suppression system is configured to dispel, at the exit thereof, the inert gas mixture comprising less than approximately 4% by volume of carbon dioxide.

116. A fire suppression system, comprising:

a chamber and at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant housed therein, the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant formulated to pyrotechnically produce a first gas mixture comprising carbon dioxide, the fire suppression system configured to dispel, at an exit thereof, the first gas mixture and a second gas mixture comprising carbon dioxide into a space to provide carbon dioxide at a concentration less than or equal to the Immediately Harmful to Life or Health concentration of carbon dioxide in the space.

117. A fire suppression system, comprising:

a chamber and at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant housed therein, the at least one non-azide,

non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant formulated to pyrotechnically produce an inert gas mixture comprising carbon dioxide at a concentration less than or equal to the Immediately Harmful to Life or Health concentration of carbon dioxide,

the fire suppression system configured to dispel, at an exit thereof, at least a portion of the inert gas mixture, the dispelled inert gas mixture comprising carbon dioxide in a concentration equal to the concentration pyrotechnically produced by the at least one non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate gas generant.

118. A fire suppression system, comprising:

a chamber and at least one gas generant housed therein, the at least one gas generant comprising a non-azide, non-azole, non-aminoguanidine nitrate, non-triaminoguanidine nitrate composition formulated to pyrotechnically produce an inert gas mixture comprising carbon dioxide,

the fire suppression system configured to dispel, at an exit thereof, the inert gas mixture as pyrotechnically produced into a space, the space comprising carbon dioxide at less than approximately 4% by volume.

119. The fire suppression system of claim 118, wherein the fire suppression system is configured to dispel, at the exit thereof, the inert gas mixture comprising less than approximately 1% by volume of carbon dioxide.

APPENDIX B

RELATED PROCEEDINGS APPENDIX

Notice of Panel Decision in the '088 Application and Appeal No. 2002-0304

U.S. Patent Application No. 10/727,088

Filed December 2, 2003

Paper No. 33

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JERALD C. HINSHAW, DANIEL W. DOLL, REED J. BLAU and GARY K. LUND

Appeal No. 2002-0304
Application No. 09/025,345

ON BRIEF

Before KIMLIN, GARRIS and WALTZ, Administrative Patent Judges.

KIMLIN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1, 83-91 and 114-117. Claims 40, 78, 81, 82 and 92-113, the other claims remaining in the present application, stand withdrawn from consideration. Claim 1 is illustrative:

1. A solid gas generating composition formulated for generating gas suitable for use in deploying an air bag or balloon from a supplemental restraint system, said solid gas generating composition comprising:

a complex of a metal cation and a neutral ligand containing hydrogen and nitrogen, such that when the complex combusts, a mixture of gases suitable for use in deploying an air bag or balloon from the supplemental restraint system is produced; and

sufficient oxidizing anion to balance the charge of the metal cation.

The examiner relies upon the following references as evidence of obviousness:

Rausch	3,138,498	June 23, 1964
Cook et al. (Cook)	2,220,891	Nov. 12, 1940
Christmann et al. (Christmann)	3,921,497	Nov. 25, 1975
Hommel et al. (Hommel)	4,925,600	May 15, 1990

Appellants' claimed invention is directed to a solid gas generating composition which combusts to produce a mixture of gases suitable for use in deploying an air bag in, for example, an automobile. The composition comprises a complex of a metal cation and a neutral ligand, e.g., a metal nitrate ammine, and an oxidizing anion, a nitrate or peroxide. The complex, upon combustion, generates a mixture of gases containing nitrogen and water vapor. According to appellants, "the production of other undesirable gases or particulates may be substantially reduced or eliminated" (page 7 of principal brief, first paragraph). The species of the complex elected by appellants is cobalt nitrate ammine.

Appealed claim 1 stands rejected under 35 U.S.C. § 102(b) as being anticipated by each of Cook, Rausch and Hommel. Claims 1, 85-91, 114, 115 and 117 stand rejected under 35 U.S.C. § 103 as being unpatentable over Cook and Hommel in view of Christmann. The examiner has withdrawn the rejection of claims 83, 84 and 116 (see page 2 of Answer, second paragraph).

Upon careful consideration of the opposing arguments presented on appeal, we will not sustain the examiner's 35 U.S.C. § 102 and § 103 rejections based on Cook and Hommel. We will, however, affirm the examiner's 35 U.S.C. § 102 rejection of claim 1 over Rausch. Our reasoning follows.

Claim 1 on appeal defines a complex of a metal cation and a neutral ligand which, upon combustion, generates "a mixture of gases suitable for use in deploying an air bag or balloon from the supplemental restraint system." We agree with appellants that this recitation is more than a statement of intended use but, rather, a specified property of the claimed complex. Therefore, the initial burden is upon the examiner to establish that the compositions of Cook, Hommel and Rausch have the claimed property.

Regarding Cook and Hommel, appellants present the argument that "[t]he high concentrations of ammonium nitrate called for by

Cook and Hommel, coupled with the low concentrations of metal complexes, are unsuitable for the type of environment encountered by a supplemental restraint system" (page 10 of principal brief, second paragraph). As noted by appellants, the preponderant ingredient, i.e., greater than 50%, in the Cook composition is ammonium nitrate, whereas the maximum amount of metal complex is 10%. Likewise, the solid propellant or explosive compositions of Hommel comprise ammonium nitrate and a metal complex of between 1 and 5%. On the other hand, from the examples in appellants' specification, it is clear that the solid gas generating composition suitable for use in an air bag contains a major amount of the metal complex and minor amounts, if any, of ammonium nitrate. Therefore, based on this discrepancy in formulations between appellants' disclosed compositions and the compositions disclosed by Cook and Hommel, as well as the failure of Cook and Hommel to teach that the compositions are suitable for deployment in an air bag, we find that the burden is properly upon the examiner to offer a rationale why it is reasonable to conclude that the compositions fairly taught by Cook and Hommel would have been considered suitable for use in air bags by one of ordinary skill in the art. This, however, the examiner has not done.

The examiner submits that the claim 1 recitation "comprising" allows for additional ingredients in any types and amounts, and that claim 1 does not recite amounts for any ingredient, i.e., "there is no minimum amount of the complex oxidizer required in claim 1" (page 5 of Answer, first paragraph). While this is true, however, claim 1 does require that the composition has the property that, upon combustion, it is suitable for use in deploying an air bag or balloon. As explained above, the examiner has not established that the compositions of Cook and Hommel possess such a property.

Since Christmann does not remedy the deficiency of Cook and Hommel discussed above, it follows that we will not sustain the examiner's rejection of claims 1, 85-91, 114, 115 and 117 under 35 U.S.C. § 103.

The examiner's rejection of claim 1 under 35 U.S.C. § 102 over Rausch is another matter. Appellants do not dispute the examiner's factual determination that Rausch discloses a composition comprising a complex of a metal cation and a neutral ligand containing hydrogen and nitrogen, as presently claimed. Indeed, Rausch discloses a composition comprising a major amount of a metal perchlorate-hydrazine compound, and appellants' specification discloses that "[c]omplexes which fall within the

scope of the present invention include . . . metal perchlorate hydrazines" (page 10, last paragraph). Also, unlike Cook and Hommel, Rausch discloses a composition comprising 90 wt.% of the metal perchlorate-hydrazine complex and only 10 wt.% aluminum. Since Example 12 of the present specification discloses a composition comprising 10 wt.% aluminum nitrate, we find it reasonable to conclude that the burden is properly upon appellants to demonstrate the composition of Rausch is not suitable for use in deploying an air bag or balloon.[1] As noted by the examiner, however, no such objective evidence is of record. While appellants contend that the composition of Rausch is the type of conventional thermite composition that is disclosed in U.S. Patent No. 5,439,537 to be unsuitable for use in air bags, appellants have not established that the specific composition of Rausch does not have the claimed property. Appellants point to no reference in U.S. No. 5,439,537 to Rausch, and we fail to find any.

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[1] It is well settled that when a claimed product reasonably appears to be substantially the same as the product disclosed by the prior art, the burden is on the applicant to prove that the prior art product does not necessarily or inherently possess characteristics attributed to the claimed product. See In re Spada, 911 F.2d 705, 708, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990); In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977).

In conclusion, based on the foregoing, the examiner's decision rejecting the appealed claims is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

EDWARD C. KIMLIN)
Administrative Patent Judge)
)
)
)
BRADLEY R. GARRIS)
Administrative Patent Judge) BOARD OF PATENT
) APPEALS AND
) INTERFERENCES
)
THOMAS A. WALTZ)
Administrative Patent Judge)

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ART UNIT	PAPER NUMBER
3752	

MAIL DATE	DELIVERY MODE
09/25/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
	10/727,088	BLAU ET AL.	
	ROBIN O. EVANS	Art Unit 3700	

Document Code - AP.PRE.DEC

Notice of Panel Decision from Pre-Appeal Brief Review

This is in response to the Pre-Appeal Brief Request for Review filed 8/15/2008.

1. ☐ **Improper Request** – The Request is improper and a conference will not be held for the following reason(s):

☐ The Notice of Appeal has not been filed concurrent with the Pre-Appeal Brief Request.
☐ The request does not include reasons why a review is appropriate.
☐ A proposed amendment is included with the Pre-Appeal Brief request.
☐ Other: .

The time period for filing a response continues to run from the receipt date of the Notice of Appeal or from the mail date of the last Office communication, if no Notice of Appeal has been received.

2. ☐ **Proceed to Board of Patent Appeals and Interferences** – A Pre-Appeal Brief conference has been held. The application remains under appeal because there is at least one actual issue for appeal. Applicant is required to submit an appeal brief in accordance with 37 CFR 41.37. The time period for filing an appeal brief will be reset to be one month from mailing this decision, or the balance of the two-month time period running from the receipt of the notice of appeal, whichever is greater. Further, the time period for filing of the appeal brief is extendible under 37 CFR 1.136 based upon the mail date of this decision or the receipt date of the notice of appeal, as applicable.

☐ The panel has determined the status of the claim(s) is as follows:
Claim(s) allowed: _____.
Claim(s) objected to: _____.
Claim(s) rejected: _____.
Claim(s) withdrawn from consideration: _____.

3. ☐ **Allowable application** – A conference has been held. The rejection is withdrawn and a Notice of Allowance will be mailed. Prosecution on the merits remains closed. No further action is required by applicant at this time.

4. ☒ **Reopen Prosecution** – A conference has been held. The rejection is withdrawn and a new Office action will be mailed. No further action is required by applicant at this time.

All participants:

(1) *ROBIN O. EVANS* Robin O. Evans (3) *Davis Hwu.*

(2) *Len Tran* (4)_____.